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DEVELOPMENT AND VALIDATION OF THE KRIO VERSION OF THE WHOQOL-BREF FOR USE IN SIERRA LEONE

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ETHICAL STATEMENT.

1. Funding: none

2. Conflict of Interest: none

3. Ethical approval: The study was approved by the Institutional Review Board of Wright State University. A letter of support for soliciting participants on its premises was provided, but the Catholic Archdiocese and its agents did not obtain consent or act as representatives for the investigators.

4. Informed consent: Due to the low literacy levels for the general population of Sierra Leone, as well as the lack of familiarity with written surveys and consent forms, the administration of the surveys and gathering of consent were done verbally by native speaking research assistants.

ABSTRACT

Background.

Formal measures of subjective well-being are needed to assure that health and psychosocial support services in Sierra Leone are objectively evaluated and evidence-based. The purpose of this study was to evaluate a Krio version of the brief form of the World Health Organization's Quality of Life questionnaire (WHOQOL-BREF).

Methods.

A convenience sample of 425 adult Sierra Leoneans was verbally interviewed in the northern province of Bombali, using a previously piloted version of the scale, as well as a short demographic survey. Descriptive, correlational, and inferential statistics were used to assess evidence of reliability and validity in a manner similar to the WHOQOL-BREF international field trial.

Results.

Cronbach's alpha for the four domains ranged from 0.55 to 0.72 and improved when the three negatively phrased items requiring reversed scoring were removed, as well as when all items were treated as a unidimensional scale (alpha = 0.83). Patients scored significantly lower scores on all four subscales and the question assessing overall quality of health question. Persons with no formal education had lower scores on Physical, Psychological, and Environmental domains, as well as the two overall quality of life and health questions. Age was negatively correlated with Physical, Psychological, and Social domains, as well as the questions for overall quality of life and quality of health.

Multiple regression analyses found Physical, Psychological, and Environmental domains to be significantly associated with questions assessing overall quality of life and quality of health. Twenty-three out of 24 items correlated highest to their expected domain, but 10 also correlated above 0.40 on another domain. Confirmatory factor analysis allowing for two pairs

of error variances to co-vary showed good fit with the original scale's four domain model (χ^2/df = 3.02; CFI = .833; RMSEA =.069, 90% C.I = 0.063 - 0.076).

Conclusions.

The results indicate that the new scale shares many of the same psychometric properties as the original WHOQOL-BREF and is appropriate for health-related research. Future studies with the WHOQOL and other quality of life instruments should use caution when developing negatively phrased items in scale development, particularly when planned for use across multiple settings, as they may yield unwanted methods effects and adversely impact test reliability and internal structure.

Keywords.

Quality of Life, Krio, Sierra Leone, WHOQOL-BREF, Validation, Translation

INTRODUCTION

After two decades of civil war, natural disasters, and public health crises that included a loss of 7% of its health care workforce, Sierra Leone is now rebuilding its health and social services systems[1, 2]. Although still in an early stage of recovery, multiple partnerships between government institutions, civil society organisations, and international non-governmental organisations have been engaged in regional and national projects to deliver health and psychosocial support services, as well as rebuilding the country's capacity in these areas[3-5].

Accompanying this growth has been the necessity to develop tools to assure that such projects employ best evidence-based practices[6]. Currently, there are few standardized instruments created or adapted for use in Sierra Leone. Like many low- to middle-income countries (LMICs) coming out of crisis, the emergency health and psychosocial needs in Sierra Leone resulted in the emphasis on service delivery. Programme monitoring and evaluation for non-governmental organisations, including the development of culturally-designed patient report outcome instruments, have not been a priority[7]. The recent increase in services in LMICs has not always been accompanied by standardized outcome measures[7, 8].

Health-related quality of life (HRQOL) measures have a significant role in both physical and behavioural health research for determining cost-effectiveness and cost utility of interventions[9, 10]. Measuring subjective well-being permits a fuller picture of the success of health and social programmes that traditionally relied on external indicators, such as disability-adjusted life years, clinician reports, or employment status, for evaluating effectiveness[6, 10]. In LMICs, published studies in the past 10 – 15 years indicate a growth of their use with an interest in improving programme service delivery and increasing accountability to various stakeholders. In sub-Saharan Africa, HRQOL measures have been

translated and employed for a variety of health and psychosocial-related issues across different settings[11]. Currently, none of these measures have been adapted and evaluated for use in Sierra Leone.

One set of HRQOL measures worth investigating for use in Sierra Leone would be the World Health Organization's Quality of Life (WHOQOL) instruments. The WHOQOL questionnaires are self-assessed, cross-culturally comparable instruments to measure subjective quality of life[12]. The questionnaires are the result of decades of cross-national collaboration to create a measure to improve health-related delivery, research, and communication across settings[13]. Using an iterative process between researchers and end-users at 15 WHO field centres, the finalized version of the WHOQOL-100 was constructed with 100 Likert-type questions to measure six broad domains from 24 facets of quality of life[14, 15]. The six domains include physical health; independence; psychological health; spirituality, religion, and personal beliefs; social relationships; and environment.

Twenty language versions of the WHOQOL-100 were created in the original project[12]. There is substantial evidence from both qualitative and quantitative research methods at all stages of scale development to support the reliability and validity of the various versions[16]. In a critique of translated general HRQOL measures, the WHOQOL scales were found to have more evidence for conceptual, item, semantic, operational, measurement and functional equivalence compared to other commonly published scales[11].

Because of the length of the WHOQOL-100, the WHOQOL-BREF was developed from field data collected from the original scale. The WHOQOL-BREF is comprised of 24 items representing all 24 facets, as well as two questions to assess overall quality of life and quality of health. Three items (Questions 3, 4, and 26) are negatively phrased questions, requiring reverse scoring. Based upon confirmatory factor analysis performed from field trial data for the WHOQOL-100, items were organized into four scales: physical, psychological, social,

and environmental[17]. The questions with their corresponding facets and domains are presented in Table 1.

Insert Table 1 about here

The aim of the present study was to evaluate the short version of the WHOQOL – BREF questionnaire translated into Krio for use in Sierra Leone. There are a minimum of 17 different ethnic languages spoken in Sierra Leone, which necessitates choosing either English or Krio for developing questionnaires that can be employed across the country. While English is the primary language of government and education, Krio, a Creole-based language derived from English, is the lingua franca spoken by the most people and is particularly useful for persons with lower levels of formal education.

METHODS

Recruitment. A convenience sample of adult Sierra Leoneans were solicited by the principal investigator and a group of trained students from the University of Makeni. Two of the researchers grew up in the Bombali chiefdom and have numerous personal and familial contacts to facilitate data collection. Participants were recruited through informal contacts following announcements at various agencies operated by the Catholic Archdiocese of Makeni, which included its higher education institutions, mental health agency, and hospital.

Instruments. The Krio version of the WHOQOL-BREF was prepared previously in a pilot study conducted for the mental health programme operated by the University of Makeni[18]. The translation followed a modified version of WHO guidelines[12]. Two independent translations from different regions in Sierra Leone were created and a small sample (3 men and 3 women) of Krio speakers were asked to select their preferred translation of each item. Differences were reconciled into one instrument, which received a third confirmatory translation followed by a back translation. The final version was then administered to 115 hospital patients and community members. Feedback regarding face validity and acceptability of the scale was positive by local research assistants and test-takers. In the pilot sample, physical health subscale scores were lower among hospital patients than those in the community, as one would expect, supporting discriminant validity.

In addition, participants were given a demographic survey including patient status, age, gender, education, employment status, religion, and tribal membership, as well as an open-ended question to solicit feedback. Patient status was determined by self-report or reference to contextual knowledge from the survey location, such as the hospital or mental health agency. Due to the low literacy levels for the general population of Sierra Leone, as well as the lack of familiarity with written surveys and consent forms, the administration of the

surveys and gathering of consent were done verbally. All data gathered in the surveys were anonymised at the time of the interviews.

Statistical Methods. To evaluate the Krio version of the instrument, similar analyses to the original WHOQOL BREF international field trial were employed for comparison[17]. SPSS version 25 was used for descriptive statistics, measures of reliability, regression analyses, and mean comparisons. Confirmatory factor analysis to determine goodness of fit of the original four subscale model was conducted with Mplus. Goodness of fit measures included relative chi-square (χ^2/df), comparative fit index (CFI), and root mean square error of approximation (RMSEA). Although there is considerable debate on what constitutes acceptable cut-off values for goodness of fit[19], we adopted the following guidelines for discussing results: a χ^2/df value of less than 5 would be considered an acceptable fit; RMSEA values below .05 suggest a good fit while those from .05 to .10 suggest an acceptable fit; and CFI values above .90 and above .95 indicate acceptable and good fits, respectively.

Ethics. The study was approved by the Institutional Review Board of Wright State University. A letter of support for soliciting participants on its premises was provided, but the Catholic Archdiocese and its agents did not obtain consent or act as representatives for the investigators.

RESULTS

Participants. Sample demographics are displayed in Table 2 [Place Table 2 here]. A total of 425 participants from 16 districts were surveyed. The sample was comprised of 152 (35.8%) hospital patients/clinic outpatients and 268 (63.1%) non-patients. Sixteen tribes were represented with the most being Temne (44.5%), Limbe (12%), and Mende (10.8%), which would be expected from the Bombali chiefdom. Ages ranged from 17 – 85 years with a mean age of 27.94. More men (55.8%) were surveyed than women (43.3%), which is not surprising due the University of Makeni being one of the sampling sites with men exceeding the number of women enrolled at the university. A full range of educational levels was sampled with 53.7% enrolled or having completed higher secondary education and 35.9% having no formal education or only completing primary or junior secondary school.

Response rates. Of the 425 surveyed, 409 (96%) answered 80% or more of the items recommended in the WHOQOL manual[12] for analysis (see Table 3 for a distribution of item responses, missing responses, and measures of skewness and kurtosis)[Insert Table 3 here]. Unanswered item responses ranged from 2 – 6 % with an average of 3%. The Little MCAR test for the unanswered responses indicated they were missing completely at random ($\chi^2 = 881.69$; df = 858, p = 0.28). Floor and ceiling effects for items appear minimal with no anchor response for either 1 or 5 exceeding 26%. Skewness values ranged from -0.62 to 0.47, while kurtosis values ranged from -.01 to -1.0, indicating that for this sample size, which exceeds 300, non-normality was not an issue[20].

Measures of reliability. Table 4 provides reliability coefficients for the scale [Insert Table 4 here]. Cronbach's alpha for the original domains indicate modest values when compared to the original WHOQOL-BREF and subsequent studies, ranging from .55 for the Psychological subscale to .72 for the Environmental subscale. When treated as a unidimensional measure, the alpha coefficient for the 24 items was .83. The three negatively phrased items (3, 4, and

26) adversely affected the coefficient values. When removed, the coefficients for Physical and Psychological subscales increased to .75 and .64, respectively, and .87 for the entire scale.

Internal structure. Table 4 displays the item-total and inter-domain correlations for the four original subscales. Twenty-three out of 24 items correlated highest to their expected domain. Conversely, there was a substantial number of items correlating high across other domains with 10 correlating .4 or greater on more than one, suggesting a more homogenous construct being measured by the instrument. Inter-scale correlations ranged from .40 - .58. Confirmatory factor analysis was performed to determine level of fit for the original four-factor solution. Results indicated an acceptable to good fit, as measured by the χ^2/df (3.27) and RMSEA (.073, 90% C.I = 0.068 - 0.079) indices, but less for the CFI (.761). Repeating the analyses by removing the negatively worded items, as they lowered scale reliability, modestly improved the model fit (χ^2/df = 3.43; CFI = .798; RMSEA =.069, 90% C.I = 0.070 - 0.083). By additionally allowing for two pairs of error variances to co-vary (availability of information with opportunity for leisure activities; need for medical treatment with physical pain), the model improved still (χ^2/df = 3.02; CFI = .833; RMSEA =.069, 90% C.I = 0.063 - 0.076). These results were very similar to the original field trial study, which reported χ^2/df of 27.43, a CFI of 0.863, and a RMSEA of 0.07. While the χ^2/df for the original was higher, this is an index sensitive to large sample sizes[19].

Discriminant validity. Previous validation studies of the original WHOQOL-BREF and subsequent translated versions have compared means and correlations on individual items and domain scores for vulnerable groups, including gender, age, healthy versus ill populations, and level of education as evidence of discriminant validity[17, 21-23]. Table 5 provides descriptive statistics for responses on the overall quality of life and quality of health questions and the four original subscales by education, gender, and health status [Insert Table

5 here]. For gender, there was no significant differences for domains or general facet questions. Conversely, patients scored significantly lower than non-patients for all four subscales and the overall quality of health question, but not for the overall quality of life. One way ANOVA indicated significant effects for education for all the domains and both overall questions. In particular, Tukey pairwise comparisons found those with no formal education had lower ratings than for other groups on all four domains. For age, significant correlations were observed for physical [$r(402) = -0.15$, $p < .001$], psychological [$r(407) = -0.24$, $p < .001$], and social [$r(402) = -0.31$, $p < .001$], but not the environmental [$r(402) = -0.069$, $p = 0.08$], domains as well as both overall Question 1[$r(410) = -0.23$, $p < .001$], and Question 2 [$r(409) = -0.21$, $p < .001$].

Linear regressions of the four domains onto the overall QOL questions similar to those performed in the original scale field trial were repeated for the Krio version[17]. Table 6 summarizes the results, which were very similar to those found in the original. Physical, Psychological, and Environmental domains were found to significantly contribute in explaining variance for the overall items(Insert Table 6 here). The model for Question One ($R^2 = .42$, $p < .001$) and for Question One and Two combined ($R^2 = .52$, $p < .001$) had virtually identical values reported in the 2004 WHOQOL-BREF international field trial study (.42 and .52, respectively)[17]. For Question Two, the model was also significant ($R^2 = .37$, $p < .001$), although slightly lower than the original version's field trial ($R^2 = .41$). Another finding was the performance of the Social subscale, which has only three items, for the regression models. While statistically significant in the original field trial, in both cases it had the lowest Beta for the overall health and combined items.

DISCUSSION

The purpose of this study was to describe the development and evaluate a Krio version of the WHOQOL-BREF. The new scale has good reliability as an overall measure and the domain subscales have a fair level of internal consistency for research purposes. Reliability for physical and psychological subscales improved in our sample when the negatively worded items were removed, resulting in comparable Cronbach's alpha coefficients, despite resulting in shorter subscales. There is also good evidence for the validity of the scale. The Physical, Psychological, and Environmental domains effectively discriminate on overall quality of life, overall quality of health, age, healthy versus patient populations, and education. The Social subscale with only three items did not significantly discriminate between levels or groups on these variables. This is a frequent finding in the research. While a significant predictor on the two overall items for the original version's field trial sample of 11830 participants, this subscale often is not significant or accounts for less variance than the other domains in other studies [22-24]

Our sample came only from the northern district in Sierra Leone and had a high ratio of non-patients to patients recommended by the WHOQOL group for scale revision[12]. The group recommends a wide range of age groups with half over and half under age 45, but Sierra Leone has a young population with a median age of 19.1 years, making a 50/50 distribution at age 45 skewed in comparison to the population[25]. It would also be helpful to compare the results of this study from groups selected from other districts, including the city of Freetown. The original four-factor solution received good support when applied to the Krio version. All but one item correlated significantly and highest with its predicted domain and most of the CFA goodness of fit indices supported the model. The findings are similar to those found other translated versions of the scale used with sub-Saharan groups[21, 23, 26, 27]. Interestingly, many of these studies obtained similar results for the Questions 3, 4 and 26 (the

negatively phrased items) on item-subscale correlations and factor analyses. Redko and colleagues found all three items loaded into a separate fourth factor among Somali refugees[21]. Oehaeri and colleagues found the first two questions loading together on a fifth factor and item 26 on a sixth in their exploratory factor analysis and chose to combine the items onto the fifth factor and included the two global QOL items for their CFA[27]. Colbourn and colleagues translated the scale into Chichewa (Malawi), but did not perform a CFA[22]. All their items significantly correlated with the associated original subscales, similar to our findings. A confirmatory factor analysis of a Luganda version of the scale also found an adequate fit for the WHOQOL-BREF four domain model[23].

Although previous sub-Saharan African studies on the WHOQOL-BREF reporting CFAs have found some support for the original four-factor solution, their EFAs have yielded several cross-loadings that suggest other factor solutions may be more appropriate[21, 23, 26, 27]. Similarly, there was a substantial number of items in our study that cross-loaded onto other factors. Nine out of 24 items had loadings with differences of less than .2 between highest and next loading, which 7 of those 9 exceeding loadings of .3 on the second factor. Although the arrangement of cross-loadings have varied for different studies, they occurred often between the Physical and Psychological domains. Researchers may want to take caution when interpreting separate domain scores for the Krio version and consider combining the 24 items to serve as a general measure of quality of life, which has been done with other translated versions.[28]

As stated previously, the negatively worded items 3, 4, and 26 correlated minimally with both the original subscales and an overall scale. The WHOQOL group[17] noted that the first two items, which assessed pain and dependence on medications, were generally problematic for the physical subscale and that item 26, measuring negatively feelings on the psychological subscale, was the only item with a poor item–total correlation of below 0.30.

The use of negatively phrased items in attitude scales with Likert-type items, a practice recommended for decades to control response bias, has come into question by several authors for both theoretical and practical grounds[29-32]. Several studies have found that the insertion of negatively worded items lowered internal reliability coefficients[33] and yielded different factor solutions, often with the negatively phrased items forming their own factor[34]. One study of 3705 respondents on the General Health Questionnaire found that negatively phrased items had more response variance and inconsistency than positively phrased items[35]. In addition, the CFA model incorporating response bias on the negatively phrased items had the best fit compared to models proposed following previous factor analytic studies. In another study, a simulation of a sample of 10% of test takers carelessly responding to negatively worded items was demonstrated to significantly impact the results of CFA goodness of fit indices[36]. In a study investigating the impact of literacy levels on responding to the WHOQOL-BREF, Questions 3, 4, and 26 had the highest chi-square goodness of fit values for non-readers, meaning that the items did not fit the original four-subscale model[37].

We believe that the translation of the scale into Krio has highlighted issues in the understanding, assessment, and communicating quality of life across cultures. Krio is a creole language that developed out of the need for inter-ethnic communication between the original residents of Freetown, as well as the indigenous tribes in the region. Although there have been efforts to standardize the language, in reality, there are variant forms and this fluidity may affect its semantic equivalence.

In Krio, psychological constructs may not be easily separated from physical ones. When asking how one is doing or feeling, for example, the common question would be, "*Aw di Bodi?" Aw di bodi* is a derivative of the English phrase, "how is the body," illustrating a

focus on physical well-being. Sierra Leoneans, consequently, may be more accustomed to describing their well-being in physical terms when talking in Krio.

Another example was the selection of verbal descriptors for points on the Likert-type scale. Some of the extreme anchor points (especially when using the adjective, "very") required the creation of terms that are not used in common Krio usage, raising a question whether an individual would be able to decipher what the idiosyncrasies of the 5-point scales required. The conceptual and technical issues described here are not unique to this population and have been discussed previously for the original scale[38]. The WHOQOL study group has recommended that new language versions of its instruments test the assumption that they measure a universal construct and whether new facets, culturally specific items, or measurement scales are required.[12] As an example, the Taiwanese WHOQOL-BREF includes two additional culturally specific questions[28] and in one study in Nigeria, it was determined that a three points performed better than five points on the rating scales used on the original version[26].

Conclusion. The results of this study suggest that the Krio version of the WHOQOL-BREF can be a useful research tool for measuring quality of life. Response rates and feedback from those completing the new version provide support for its acceptability and our participants consistently spoke positively about being asked about their well-being in their local language. Furthermore, its psychometric properties for reliability and validity are consistent with those found in other translated versions. As research resources and findings become available, future studies on how quality of life is defined by Sierra Leoneans and how it may best be measured are needed.

Ethical approval. The study was approved by the Institutional Review Board of Wright State University. A letter of support for soliciting participants on its premises was provided, but the Catholic Archdiocese and its agents did not obtain consent or act as representatives for the investigators.

Declaration of Interest. None.

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Table 1: WHOQOL-BREF Domains, Questions, and Facets

Overall Quality of Life and General Health Perceptions
Q1 Overall Quality of Life
Q2 Overall Quality of Health

Physical Health Domain
Q3* Pain and discomfort
Q4* Medication dependency
Q10 Energy
Q15 Mobility
Q16 Sleep
Q17 Daily activities
Q18 Work capacity

Psychological Health Domain
Q5 Positive feelings
Q6 Spirituality
Q7 Concentration
Q11 Body image
Q19 Self-esteem
Q26* Negative feelings

Social Relationships Domain
Q20 Personal relation
Q21 Sexual activity
Q22 Social support

Environment Domain
Q8 Safety
Q9 Home environment
Q12 Financial resources
Q13 Information
Q14 Recreation
Q23 Physical environment
Q24 Health care
Q25 Transport

Questions 1 and 2 are counted as separate scores. Domain scores are calculated by computing the average of ratings for questions within domain multiplying by 4. Scores can be computed if no more than one item within domain is missing.
*Item is reverse-coded when scored.

TABLE 2: Sample Characteristics

Demographic		Frequency	Percent
Gender			
	Male	237	55.8
	Female	184	43.3
	Missing	4	0.9
Patient Status			
	Yes	152	35.8
	No	268	63.1
	Missing	5	1.1
Marital Status			
	Married	156	36.7
	Single	265	62.4
	Widow	1	0.2
	Missing	3	0.7
Years of Education			
	No formal school education	89	20.9
	Primary School (1-6 years)	38	8.9
	Junior Secondary School (7-9 years)	26	6.1
	Senior Secondary School (10-12 years)	81	19.1
	University	125	29.4
	Professional College	22	5.2
	Missing	46	10.7
Tribe			
	Temne	189	44.5
	Mende	46	10.8
	Limba	51	12.0
	Krio	18	4.2
	Fullah	32	7.5
	Mandingo	22	5.2

	Soso	9	2.1
	English	1	0.2
	Loko	10	2.4
	Kissi	5	1.2
	Yalunka	6	1.4
	Koranko	10	2.4
	Mandingo	14	3.3
	Sherbro	2	0.5
	Other	2	0.5
	Missing	8	1.9
Total		425	100

Table 3. Distribution of item responses, missing responses, and measures of skewness and kurtosis

			Rating Points[a]						
Item	Missing	Percent	1	2	3	4	5	Skewness[b]	Kurtosis
Q1	10	2%						-0.42	-0.01
Q2	11	3%						-0.46	-0.49
Q3	11	3%	53 (12.5)	128 (30.1)	130 (30.6)	81 (19.1)	22 (5.2)	0.18	-0.65
Q4	11	3%	33 (7.8)	113 (26.6)	99 (23.3)	126 (29.6)	43 (10.1)	-0.06	-0.95
Q5	14	3%	13 (3.1)	116 (27.3)	158 (37.2)	85 (20.0)	39 (9.2)	0.28	-0.51
Q6	10	2%	10 (2.4)	54 (12.7)	96 (22.6)	145 (34.1)	110 (25.9)	-0.50	-0.56
Q7	8	2%	7 (1.6)	84 (19.8)	145 (34.1)	137 (32.2)	44 (10.4)	-0.04	-0.65
Q8	16	4%	13 (3.1)	75 (17.6)	152 (35.8)	135 (31.8)	34 (8.0)	-0.16	-0.40
Q9	12	3%	31 (7.3)	103 (24.2)	138 (32.5)	107 (25.2)	34 (8.0)	-0.01	-0.66
Q10	8	2%	27 (6.4)	79 (18.6)	116 (27.3)	144 (33.9)	51 (12.0)	-0.29	-0.66
Q11	12	3%	28 (6.6)	78 (18.4)	89 (20.9)	109 (25.6)	109 (25.6)	-0.33	-1.00
Q12	9	2%	96 (22.6)	143 (33.6)	87 (20.5)	80 (18.8)	10 (2.4)	0.34	-0.90
Q13	8	2%	36 (8.5)	139 (32.7)	133 (31.3)	86 (20.2)	23 (5.4)	0.22	-0.59
Q14	9	2%	37 (8.7)	146 (34.4)	162 (38.1)	59 (13.9)	12 (2.8)	0.24	-0.17
Q15	9	2%	10 (2.4)	57 (13.4)	137 (32.2)	163 (38.4)	49 (11.5)	-0.32	-0.29
Q16	13	3%	20 (4.7)	60 (14.1)	105 (24.7)	160 (37.6)	67 (15.8)	-0.47	-0.43
Q17	13	3%	19 (4.5)	59 (13.9)	135 (31.8)	158 (37.2)	41 (9.6)	-0.41	-0.24
Q18	14	3%	24 (5.6)	67 (15.8)	127 (29.9)	149 (35.1)	44 (10.4)	-0.36	-0.44
Q19	25	6%	14 (3.3)	32 (7.5)	105 (24.7)	152 (35.8)	97 (22.8)	-0.62	-0.02
Q20	22	5%	21 (4.9)	36 (8.5)	111 (26.1)	159 (37.4)	76 (17.9)	-0.62	-0.02
Q21	18	4%	30 (7.1)	47 (11.1)	98 (23.1)	143 (33.6)	89 (20.9)	-0.57	-0.45
Q22	14	3%	25 (5.9)	44 (10.4)	117 (27.5)	161 (37.9)	64 (15.1)	-0.57	-0.16
Q23	17	4%	29 (6.8)	59 (13.9)	122 (28.7)	155 (36.5)	43 (10.1)	-0.46	-0.38
Q24	13	3%	51 (12)	100 (23.5)	126 (29.6)	98 (23.1)	37 (8.7)	0.01	-0.81
Q25	14	3%	85 (20.0)	121 (28.5)	114 (26.8)	63 (14.8)	28 (6.6)	0.34	-0.72
Q26	10	2%	31 (7.3)	172 (40.5)	119 (28.0)	71 (16.7)	22 (5.2)	0.47	-0.39

[a] Rating points reported in number of respondents with percent within parentheses.

[b]: Standard error of skewness is 0.12. Standard error of kurtosis is 0.24

Table 4: Item-Total, Inter-Subscale, and Reliability Coefficients for Krio Version of the WHOQOL-BREF Domains

		Physical	Psychological	Social	Environmental	Cronbach's Alpha
Physical			0.58	0.49	0.54	0.56†
Question	3	**0.41**	0.11	0.17	0.06	
	4	**0.48**	0.16	0.11	0.05	
	10	**0.62**	0.47	0.28	0.45	
	15	**0.54**	0.36	0.22	0.36	
	16	**0.66**	0.50	0.45	0.51	
	17	**0.71**	0.37	0.44	0.42	
	18	**0.68**	0.43	0.37	0.39	
Psychological		0.58		0.39	0.56	0.55††
Question	5	0.34	**0.59**	0.21	0.43	
	6	0.15	**0.58**	0.06	0.24	
	7	0.42	**0.63**	0.26	0.42	
	11	0.44	**0.67**	0.29	0.38	
	19	0.51	**0.65**	0.45	0.42	
	26	0.13	**0.34**	0.07	0.04	
Social		0.49	0.39		0.40	0.58
Question	20	0.34	0.28	**0.76**	0.29	
	21	0.35	0.23	**0.77**	0.28	
	22	0.40	0.36	**0.69**	0.33	
Environmental		0.54	0.56	0.40		0.72
Question	8	0.39	**0.54**	0.20	0.53	
	9	0.28	0.34	0.21	**0.58**	

12	0.39	0.32	0.19	**0.64**
13	0.22	0.34	0.15	**0.58**
14	0.16	0.33	0.14	**0.48**
23	0.44	0.34	0.41	**0.63**
24	0.30	0.27	0.31	**0.60**
25	0.33	0.19	0.27	**0.62**

Coefficients in bold print indicate highest item-scale coefficient.
†Physical Domain Scale Cronbach's alpha with items 3 and 4 removed = 0.75;
††Psychological Domain Scale Cronbach's alpha with item 26 removed = 0.64

Table 5: Overall Quality of Life Ratings and WHOQOL-BREF Domain Scores by Demographic

Demographic		Q1 - How would you rate your quality of life?	Q2 - How satisfied are you with your health?	Physical Domain	Psychological Domain	Social Domain	Environment Domain
Entire Sample							
	Mean (SD)	3.24 (0.94)	3.27 (1.08)	13.17 (2.46)	13.68 (2.43)	14.10 (3.24)	11.49 (2.49)
	N	415	414	407	412	412	408
Gender							
Male		3.30 (0.95)	3.22 (1.07)	13.24 (2.52)	13.79 (2.57)	14.22 (3.26)	11.42 (2.40)
		233	232	227	230	229	225
Female		3.16 (0.93)	3.32 (1.09)	13.06 (2.40)	13.55 (2.28)	13.95 (3.24)	11.57 (2.61)
		180	180	178	180	180	180
Total		3.24 (0.94)	3.26 (1.08)	13.17 (2.47)	13.68 (2.44)	14.10 (3.25)	11.49 (2.49)
		413	412	405	410	409	405
T-tests for Gender		$t(411) = 1.54$ [a]	$t(410) = -0.90$ [a]	$t(403) = 0.74$ [a]	$t(408) = 0.98$ [a]	$t(407) = 0.82$ [a]	$t(403) = -0.058$ [a]
Year of Education							
No school education		2.67 (1.07)	2.85 (1.14)	11.77 (2.57)	12.35 (2.38)	12.83 (3.51)	10.57 (2.57)
		86	86	86	85	88	87

Primary School (1-6 years)	3.35 (0.89)	3.03 (1.12)	12.70 (2.24)	13.58 (2.35)	13.93 (3.38)	11.81 (2.67)
	37	37	36	37	36	36
Junior Secondary School (7-9 years)	2.96 (0.77)	3.50 (0.86)	13.64 (1.67)	13.22 (1.54)	15.13 (2.87)	11.96 (1.71)
	26	26	26	26	26	26
Senior Secondary School (10-12 years)	3.20 (0.84)	3.46 (1.11)	13.66 (1.67)	13.70 (2.16)	14.27 (2.98)	11.62 (2.36)
	81	81	80	80	80	79
University	3.51 (0.82)	3.35 (1.00)	13.53 (2.36)	14.52 (2.48)	14.30 (3.14)	11.46 (2.31)
	122	122	117	120	119	117
College	3.55 (0.60)	3.14 (0.83)	13.09 (3.27)	14.00 (2.40)	14.03 (2.75)	11.89 (1.75)
	22	22	22	22	22	22
Total	3.19 (0.94)	3.22 (1.07)	13.04 (2.47)	13.61 (2.43)	13.95 (3.23)	11.37 (2.39)
	376	376	369	372	373	369
Oneway ANOVAs for levels of education	$F(5,368) = 10.40^{d}$	$F(5,368) = 4.00^{c}$	$F(5,361) = 7.59^{d}$	$F(5,364) = 9.07^{d}$	$F(5,365) = 3.33^{c}$	$F(5,361) = 2.98^{b}$
Patient						
Yes	3.18 (0.92)	2.71 (1.05)	12.12 (2.14)	13.20 (2.65)	13.61 (3.29)	11.03 (2.44)
	149	149	144	148	145	144
No	3.27 (0.95)	3.58 (0.96)	13.75 (2.45)	13.95 (2.27)	14.38 (3.20)	11.75 (2.50)
	263	262	260	261	263	260

Total	3.24 (0.94) 413	3.27 (1.08) 412	13.18 (2.47) 405	13.68 (2.44) 410	14.1 (3.25) 409	11.49 (2.50) 405
T-test for patient status	$t(410) = -0.92$	$t(287^*) = -8.32^{d}$	$t(402) = -6.71^{d}$	$t(268^*) = -2.90^{d}$	$t(406) = -2.30^{b}$	$t(402) = -2.77^{d}$

Note: possible scores for Q1 and Q2 range from 1 – 5. Possible domain scores range from 4 – 20. *Levene's Test indicate unequal variances for Q1 and Physical domain. Degrees of freedom were adjusted from 409 to 287 for Q1 and from 407 to 268 for the Psychological domain.

[a] $p > .05$
[b] $p < 0.05$
[c] $p < 0.01$
[d] $p < 0.001$

Table 6: Regression Analysis and Standardized β Coefficients for the WHOQOL-BREF Four Domains on Overall Quality of Life and Health Satisfaction

	Physical	Psychological	Social	Environmental	R^2
Overall Quality of Life	0.11*	0.32**	0.06	0.29**	0.42**
Overall Satisfaction of Health	0.29**	0.14*	0.05	0.26**	0.37**
Health and Quality of Life	0.24**	0.26**	0.06	0.32**	0.52**

*p<.05 **p<.01